

# Lower Duwamish Waterway Stakeholders Meeting

The background image shows a river scene. In the foreground, there are many bare, brown tree branches and some green ferns. The river is in the middle ground, reflecting the sky and the distant bridge. The bridge is a large, multi-lane bridge with a yellow and blue structure. The sky is overcast and grey.

April 24, 2019



# Community Involvement Updates





# Upcoming Events

## ▶ Duwamish Roundtable

- Wednesday, May 29      6-8 PM

Youngstown Cultural Arts Center (Delridge neighborhood)

## ▶ Boeing Plant 2

- public comment period on Corrective Measures Study / Statement of Basis
- *early summer*



# EPA: Cleanup of the LDW



# Pre-Design Studies - Data Evaluation Report

Data reports approved, posted on LDWG.org

Data loaded in EIM

Results of baseline sampling summarized at November Stakeholder meeting.

Draft Data Evaluation Report was submitted to EPA 12/17/2019.

EPA comments on the document pending

- Despite sample compositing, high variability for some results
- potential refinements to sampling approach
- analysis of cPAHs in archived clam tissue - ongoing



# Upper Reach RD - River Mile 3 to 5

- ▶ LDWG contractors selected - Anchor QEA (engineering) and Windward (sampling).
- ▶ Notice to Proceed February 14, 2019 - Triggers enforceable dates.
- ▶ First deliverables June 14, 2019 - Remedial Design Work Plan and Pre-Design Investigation Work Plan.
- ▶ Pre-Design Investigation to refine areas for application of remedial technologies by sampling.
- ▶ Goal - first round of sampling in spring 2020 - daytime low tides.
- ▶ Expect a second round of PDI sampling to follow.
- ▶ Bathymetry update is underway, based on April survey in Upper Reach.



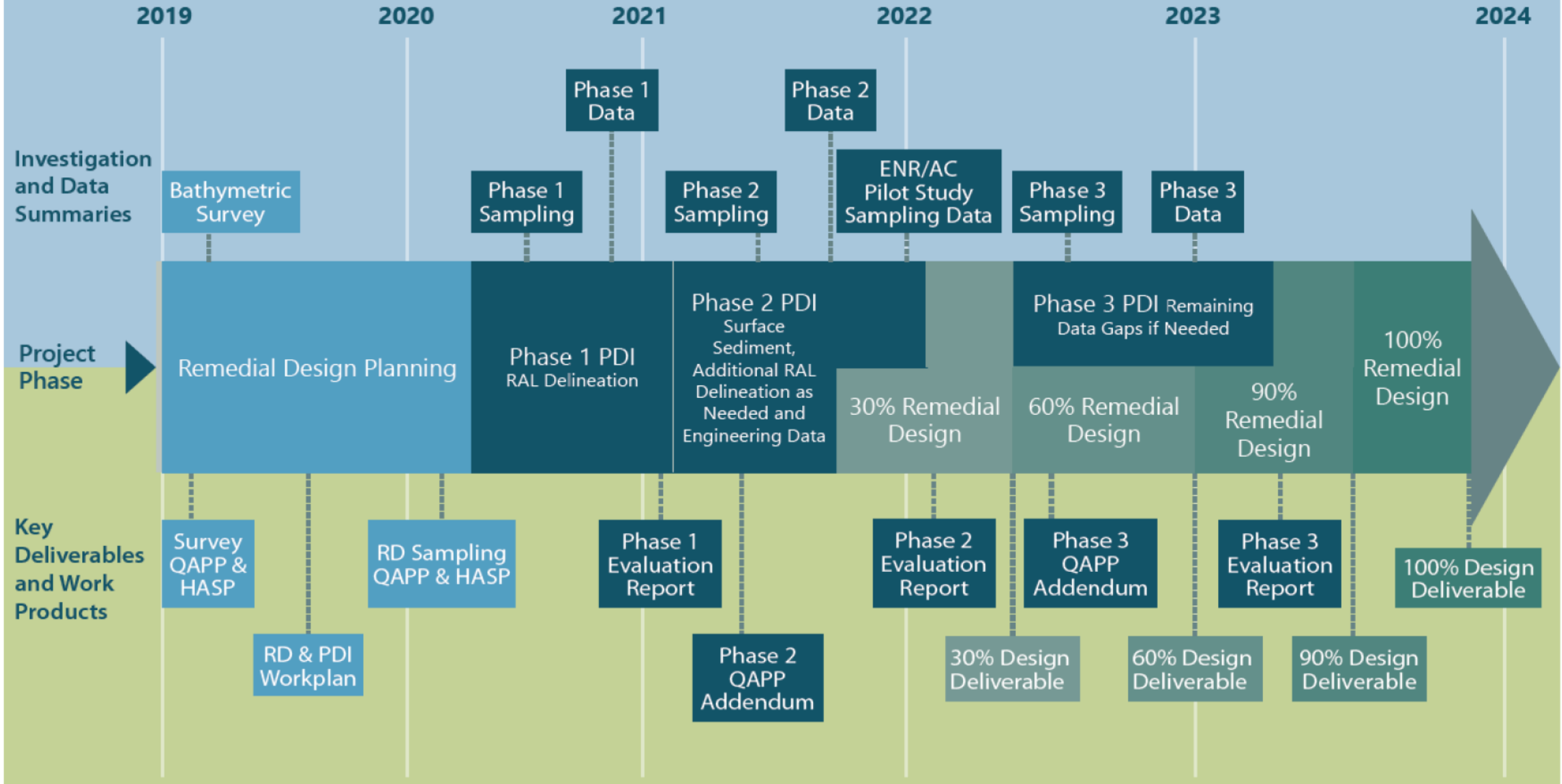
# Upper Reach Remedial Design Draft Schedule

## **Current estimate:**

- Two phases of spring field work - 2020, 2021
- Tiered analyses - to refine areas
- 100% design by August 2024?
- Actual schedule may differ - review times, revision times

# LDW Upper Reach Remedial Design Timeline

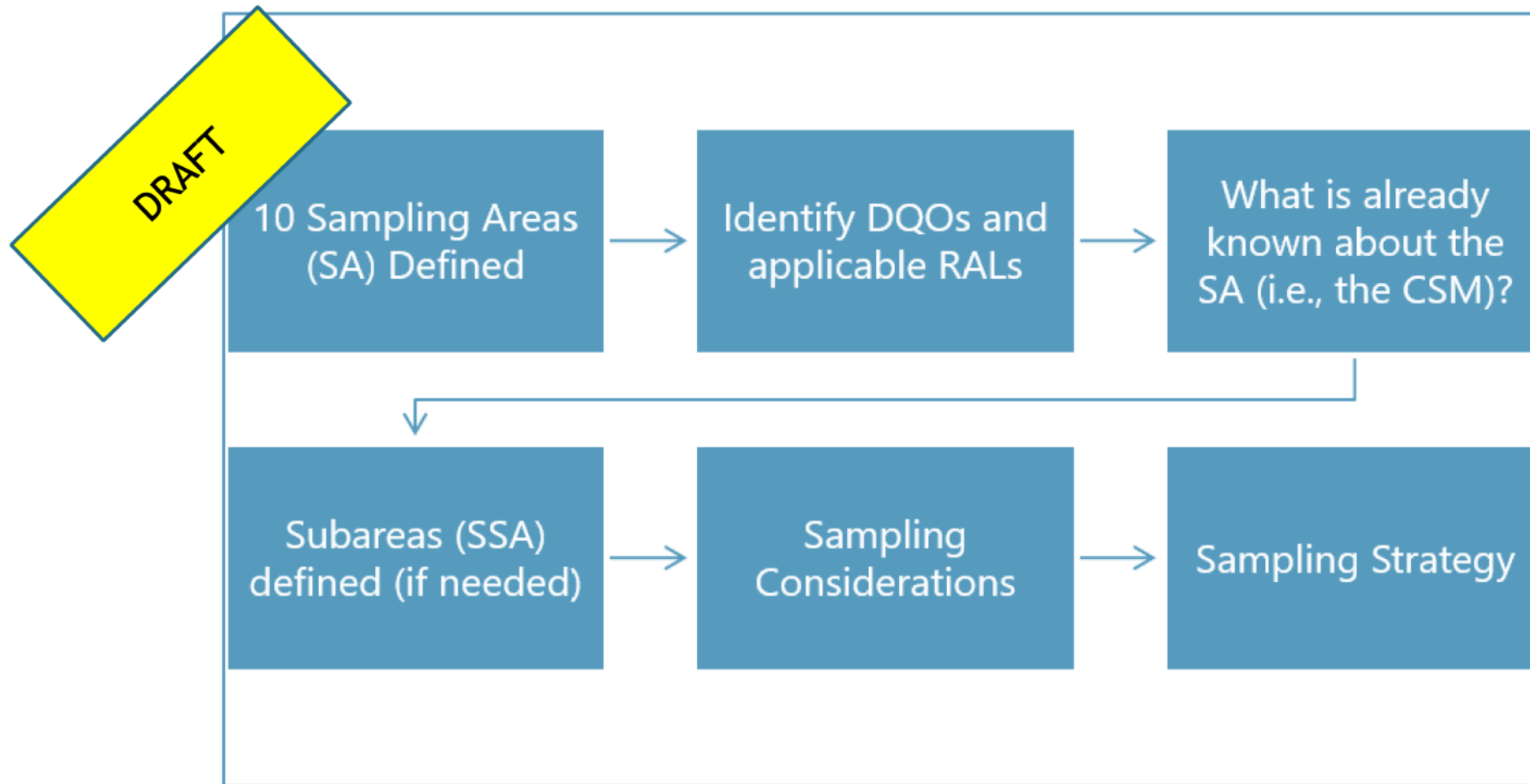
Proposed by LDWG





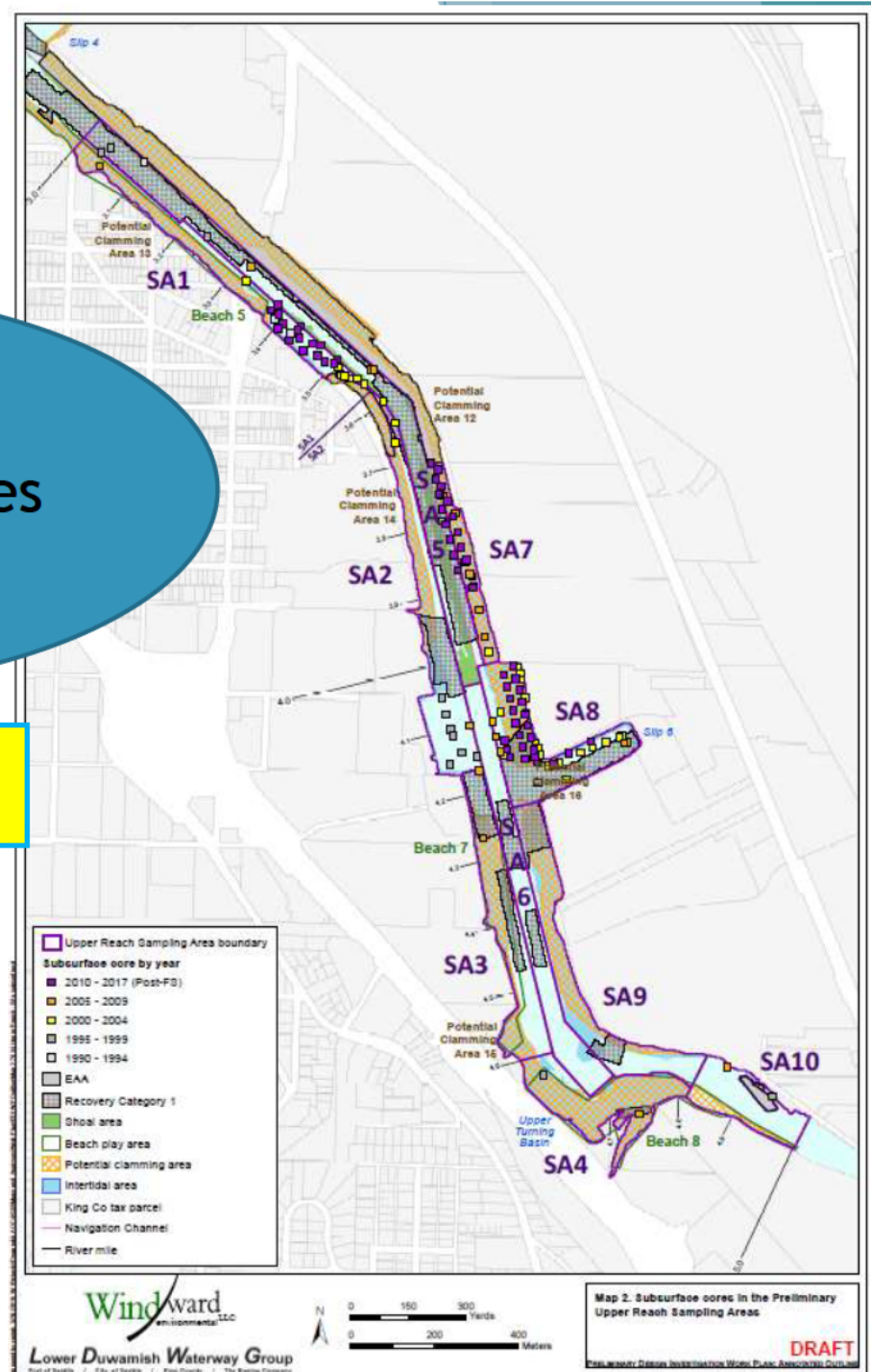
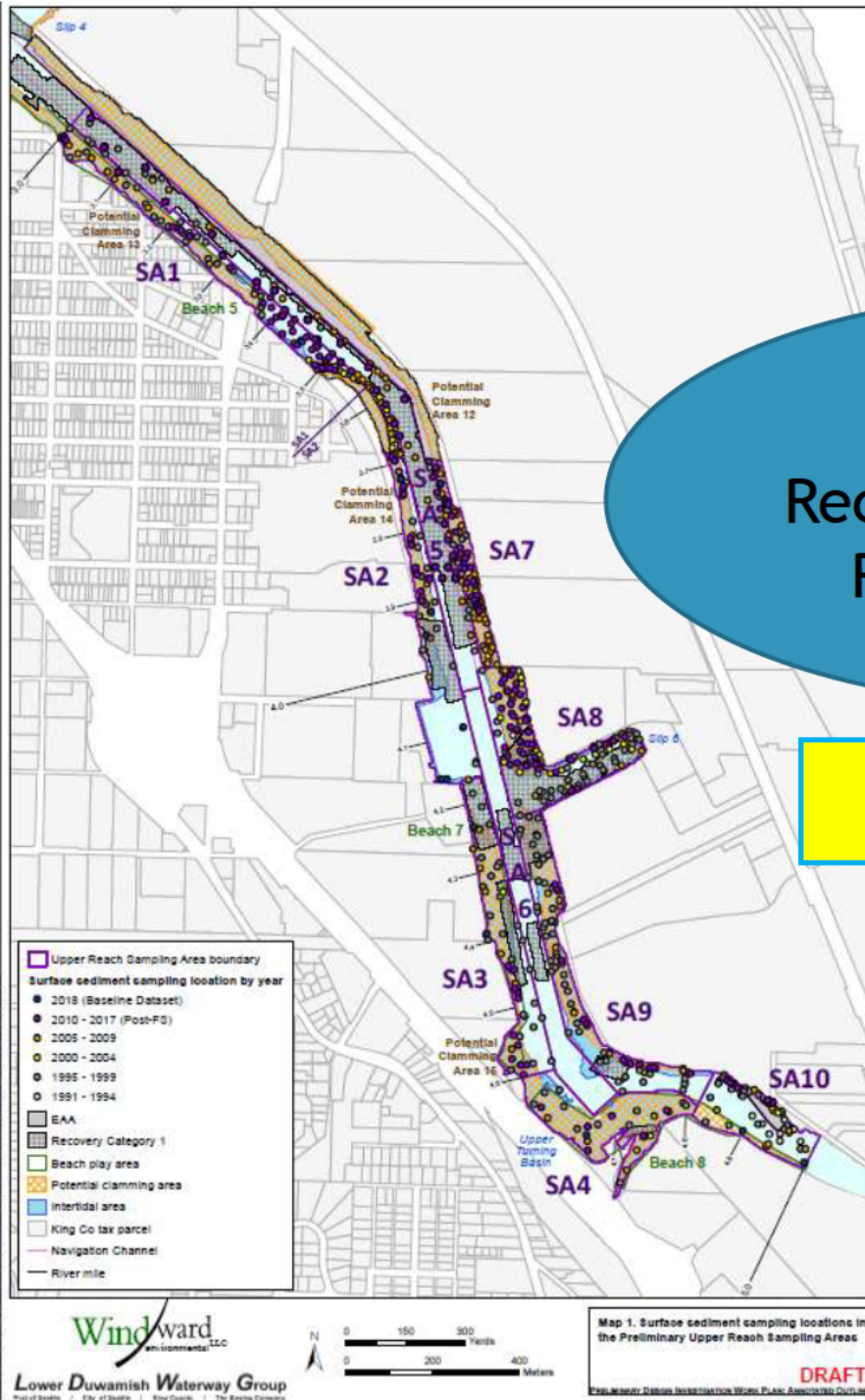
# Conceptual Pre-Design Investigation Work Plan for Upper Reach

## Path to Determine Sampling Strategy



Starting point:  
Lots of data  
Recovery Categories  
RAL application  
depths/areas

DRAFT

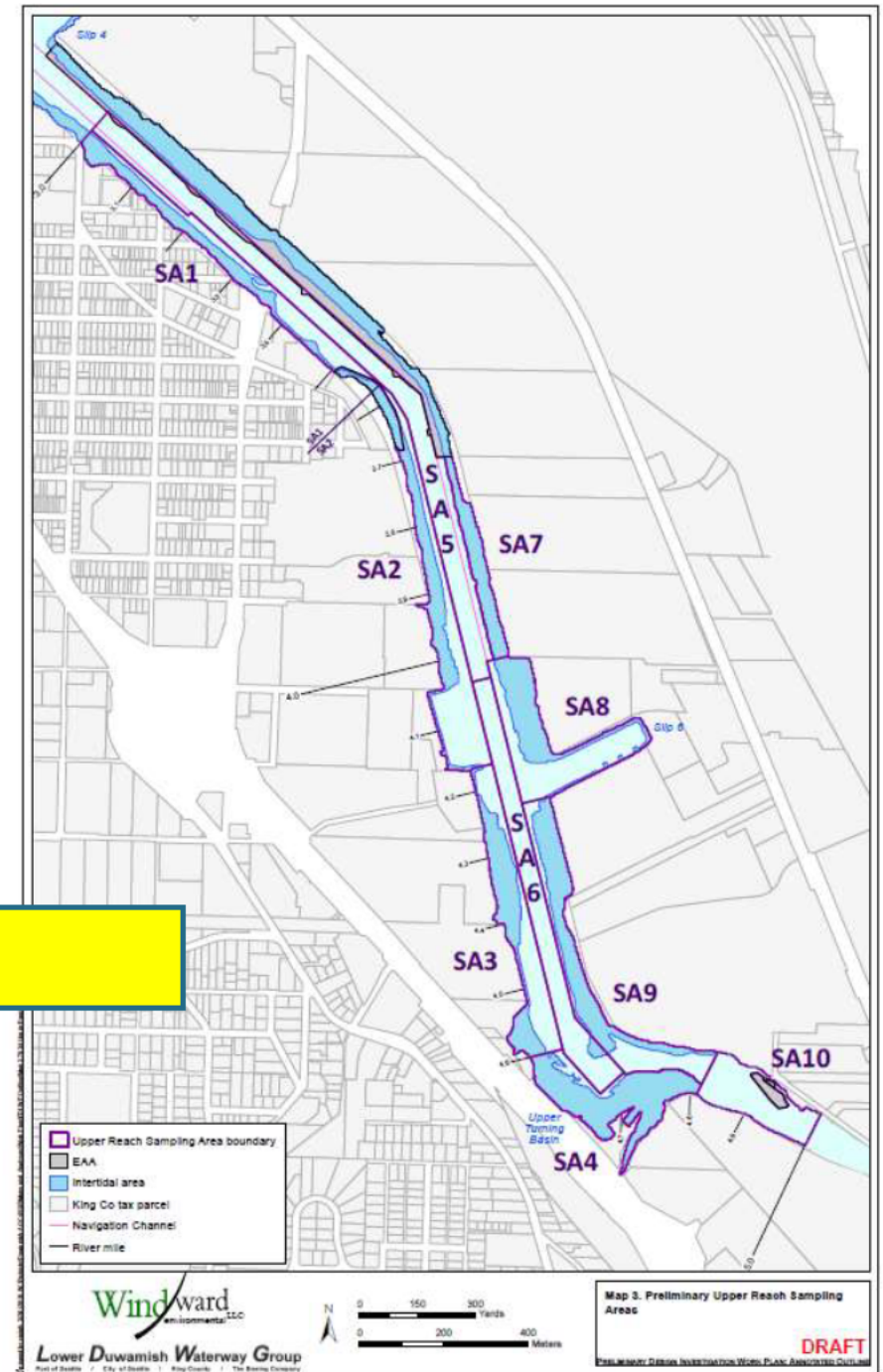


## LDW Preliminary Approach: Upper Reach Sub-Areas for Design

### Sampling will consider:

- Subtidal versus intertidal
- Navigation channel
- Recovery Category 1, 2, or 3
- Phased field effort, tiered analyses
- Early Action Areas not included

DRAFT





# Change in IRIS toxicity value for benzo(a)pyrene

Effect on Lower Duwamish Waterway?

# IRIS Toxicity Value for benzo(a)pyrene

- ▶ IRIS established in 1985 to provide a database of human health assessments for chemicals
- ▶ IRIS periodically selects contaminants for review.
- ▶ IRIS review of 1984 value for benzo(a)pyrene initiated with interagency science consultation on draft in June 2011.
- ▶ After multiple rounds of public comment and peer review, assessment finalized January 2017.
- ▶ B(a)p is the keystone for cPAH TEQ risk estimation. Apply a factor ( $<1$ ) to calculate cancer risk from other carcinogenic PAHs.

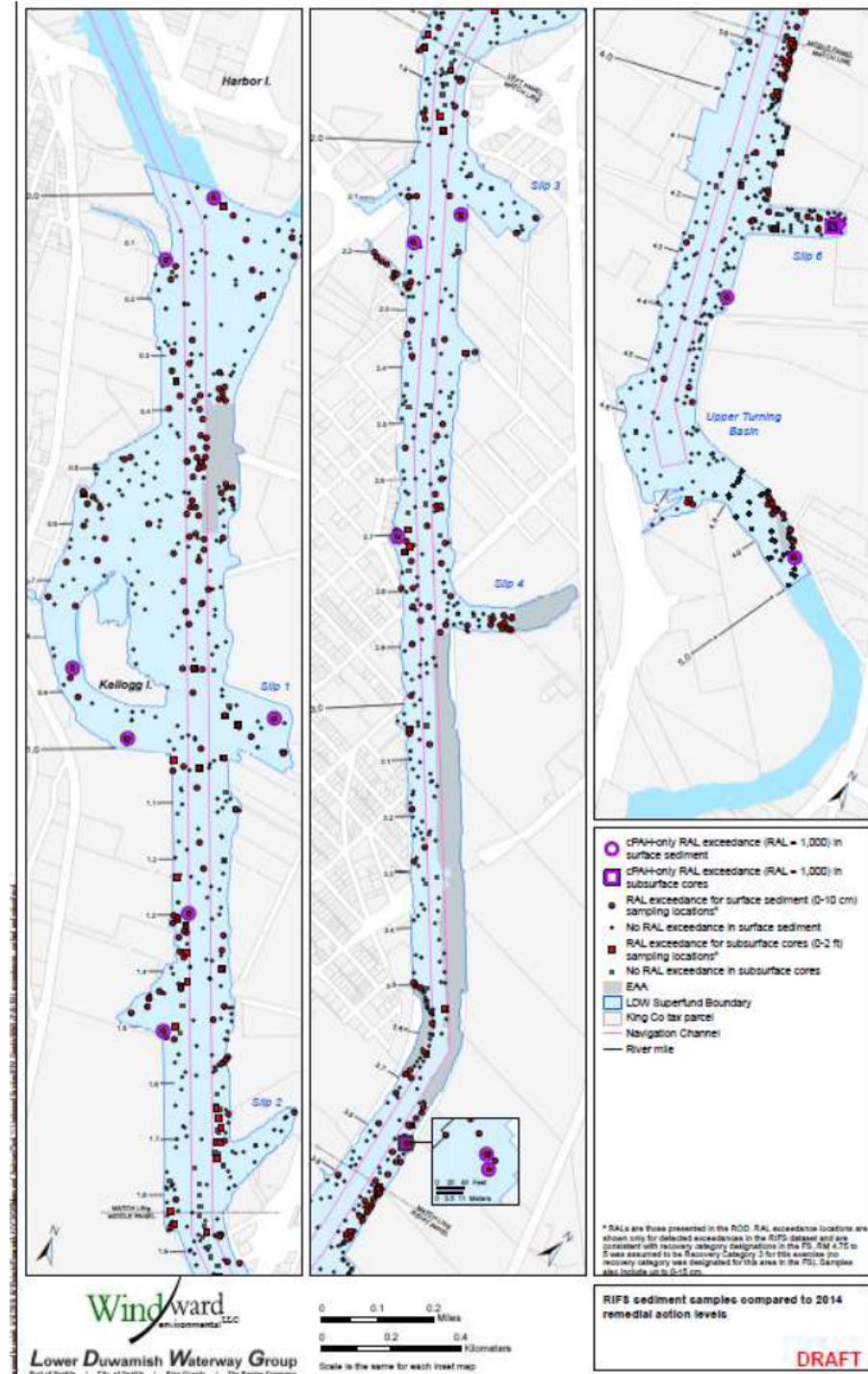
# IRIS Toxicity Value for benzo(a)pyrene

*(continued)*

- ▶ Other sites, including Portland Harbor, East Waterway, and Wyckoff/Eagle Harbor are incorporating the new information.
- ▶ IRIS report: benzo(a)pyrene is a less potent carcinogen than previously thought. Relative potency not changed, so overall cPAH risk is reduced. Same level of protection can be achieved at higher concentration.
- ▶ EPA is evaluating the implications of this for LDW cleanup.



RI/FS sample locations  
(purple circles/squares  
show where ONLY  
cPAHs exceeded the  
current RAL)



# Sampling Updates

# 2019 Field Activities

- ▶ **Earle M. Jorgensen** - Sampling to assess the need for further cleanup at this site was delayed due to the January government shutdown and the extreme cold weather conditions encountered in February. Collection of sediment, backfill, and porewater was resumed in mid-March and has now been completed. The Data Summary Report is expected in June.
- ▶ **Terminal 117** - Year 3 monitoring/maintenance report from 2018 in review: results of upland storm drain solids sampling, stormwater, visual inspections, maintenance. Year 4 adds sediment; Sampling done in March 2019 at 4 locations in dredge/fill footprint, 5 perimeter locations.
- ▶ **Slip 4 EAA** - Year 7 monitoring/maintenance sampling early August
- ▶ **Boeing Plant 2** - October sediment sampling in EAA.
- ▶ **Carbon Amendment Pilot Study** - Year 2 monitoring this spring (more info below)
- ▶ **Bathymetric Survey of Upper Reach** - Performed in April for Remedial Design



# Fishing Institutional Controls

# Fish Consumption Institutional Control Plan Update



FUN TO CATCH  
TOXIC TO EAT

THE ONLY DUWAMISH SEAFOOD SAFE TO EAT IS SALMON  
Loại hải sản an toàn nhất để ăn từ sông Duwamish là cá hồi  
El único pescado del río Duwamish que es seguro para comer es el salmon  
ត្រីដែលចាប់ពីស្ទឹងឌូវមីស្មានដរត្រីសាលម៍, នមួយគ្រប់ដែលមានស្ទុំរចិរភាពក្នុងការបរិភោគ

## Remedy Fish Consumption IC Goal- Behavior Change



Safer to eat:  
salmon



Consumption  
of resident  
seafood

- ICs are **non-engineered instruments**. . . that **help to minimize the potential for exposure to contamination**. . .
- ICs are **designed to work by**. . .**providing information that helps modify or guide human behavior at a site**. . .
- **ICs should be carefully evaluated, selected, and narrowly tailored to meet the cleanup objectives for the site in a manner that does not unnecessarily restrict the reasonably anticipated future land use or resources.**

(emphasis added)

# Fisher Study “take-aways” for developing Duwamish fish IC program

Non-English speakers more likely to target resident fish.

Relationships matter!  
***Involving the impacted community is vital to success of health promotion strategies.***

Risk perception is based on experience & senses - not “Risk Assessor” concept of exposure and outcome.

Outreach needs to target those trusted sources of information specific to community

Emotional connection to the Duwamish; accessible and know fishing regs

Fishers tend to be male; preparers primarily females (target demo for health message).



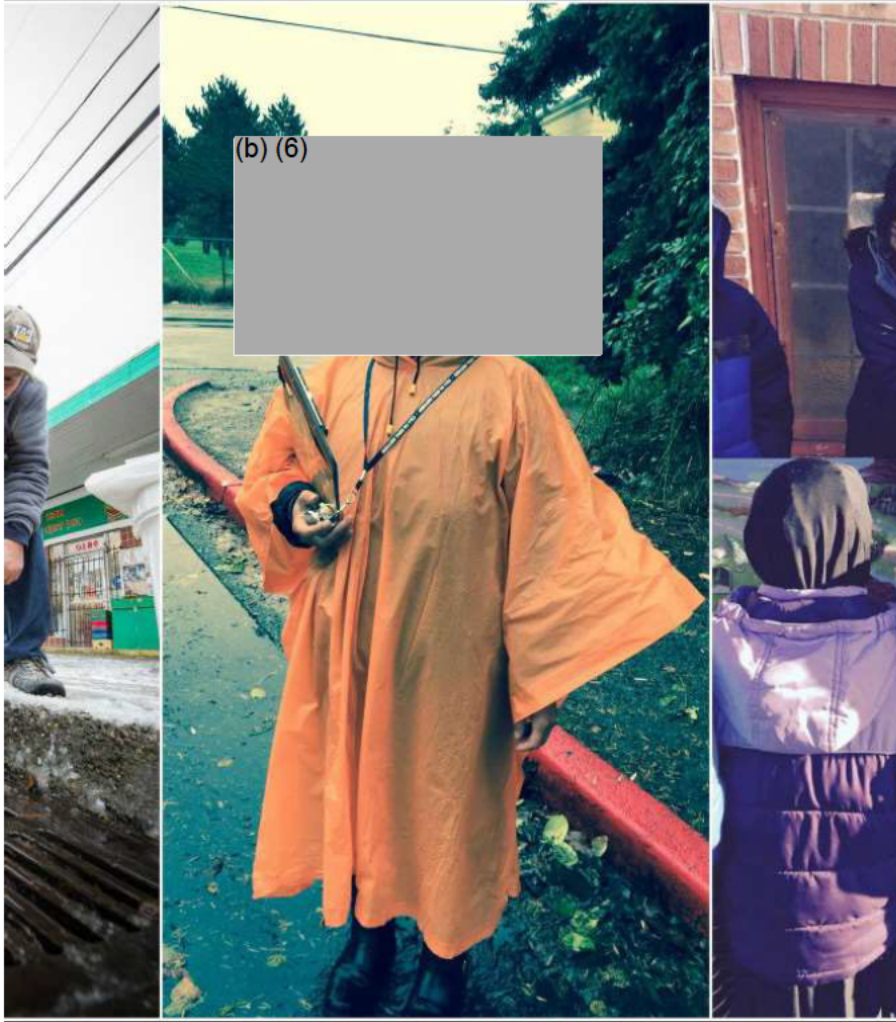
Promoting *healthy* fish  
consumption behaviors



Safer to eat:  
salmon



Consumption  
of resident  
seafood



## Developing Duwamish Fish ICs via Community Based Processes



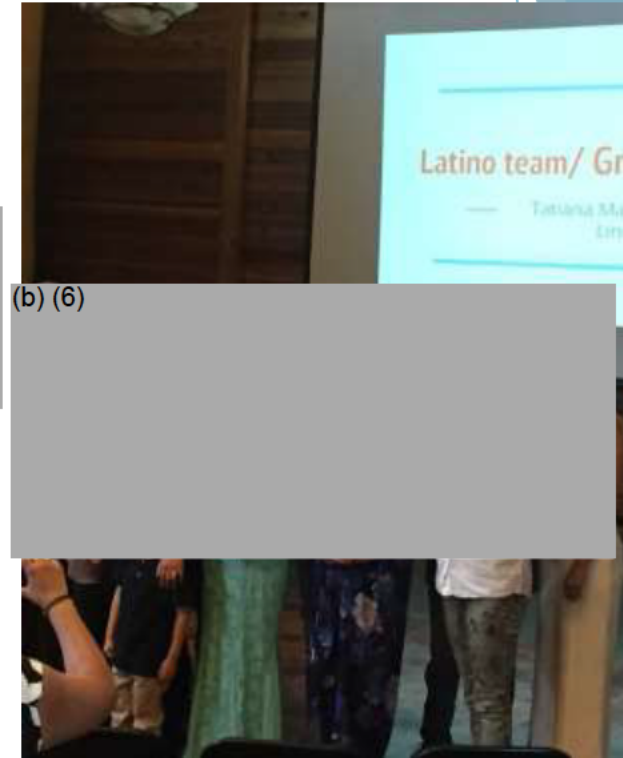
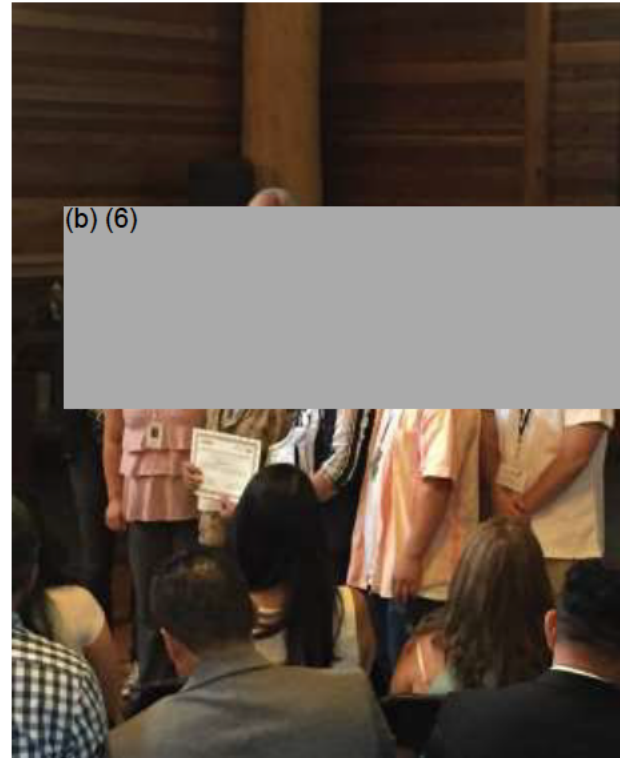
Plan

Build capacity

Build tools

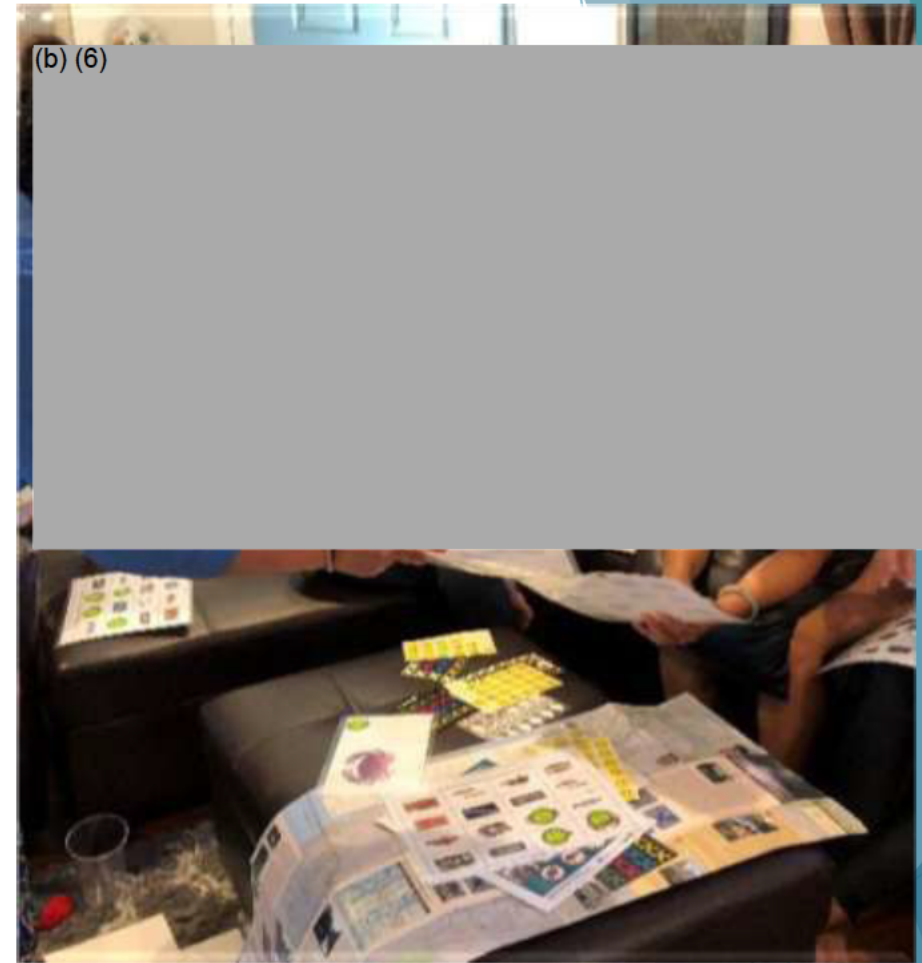
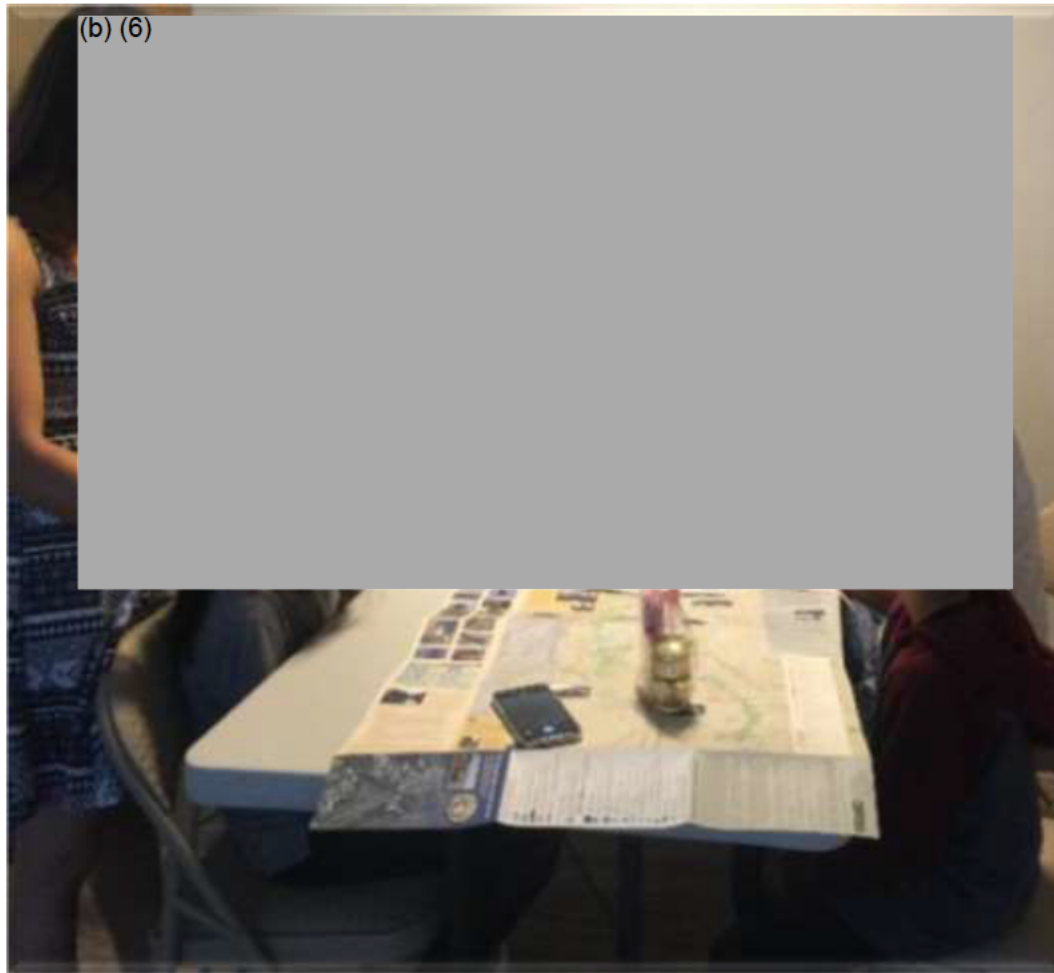
Perform risk communication

Evaluate



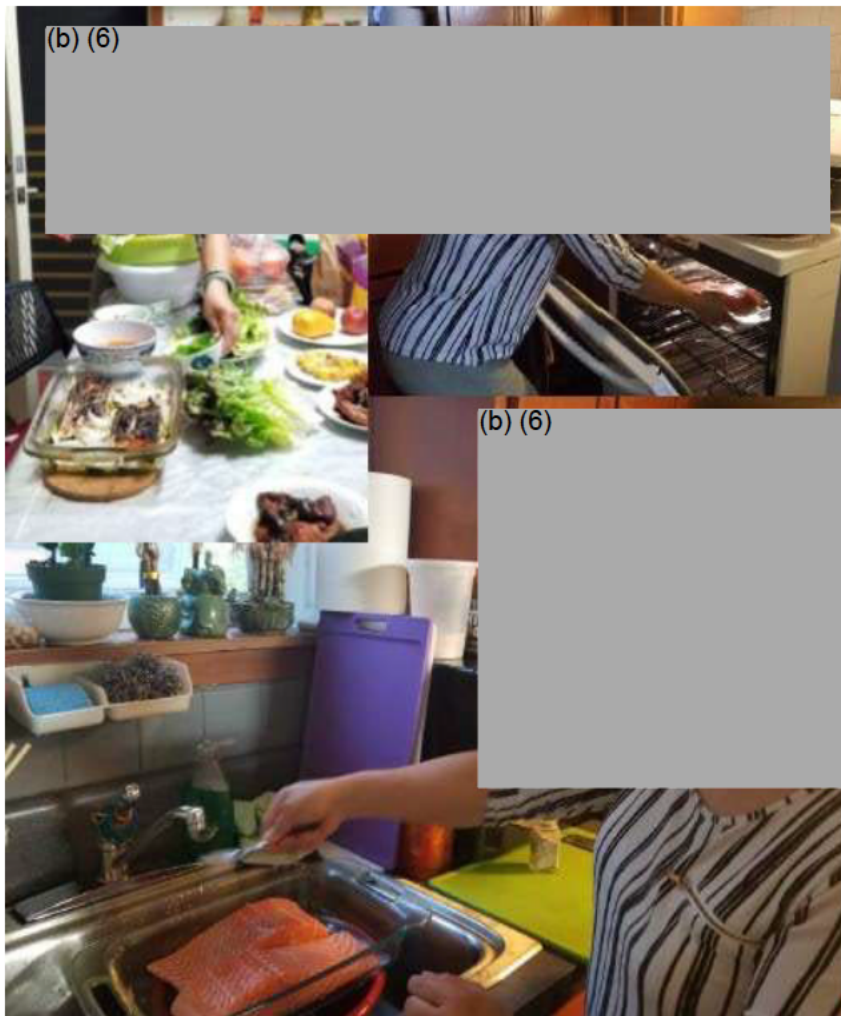
## Capacity Building: PHSKC Community Health Advocates





Tool: “Living Room” Outreach





# Recipe Cards

## Mai—Salmon Spring Rolls

### Gỏi Cuốn Cá Hồi

#### Công Thức (4 phần), nên rửa thực phẩm:

¼ chén dầu  
 2 lb Cá Hồi, Salmon fillets  
 Muối và Tiêu  
 1 bó hành lá  
 Vài lát chanh  
 1 hành tây, cắt nhỏ  
 6 tép tỏi, băm  
 20 Bánh tráng to  
 1 Bơ xà lách  
 1 Dưa leo, thái lát  
 1 Bơ he  
 1 Bơ húng Quế  
 4 c. Bún

#### Nước Xốt

Dùng chén nhỏ cho 1 muỗng canh đường, 1 muỗng canh dầu hào, ¼ chén nước mắm, một ít tiêu và khuấy đều để lát nữa rưới vào cá.

Mở lò nướng để nhiệt độ 350°F. Cá rửa muối và cạo sạch vảy. Ướp một ít muối, tiêu, sau đó chà đều cho thấm vào cá.

Hành tây cắt nhỏ và vài lát chanh rải đều vào khay nướng. Sau đó đặt cá vào khay. Rưới một lớp dầu xung quanh cá để khi nướng cá không bị khô.

Nướng 12 phút. Lật cá lại, để thêm 10 phút và rưới đều hỗn hợp nước xốt trên cá. Sau đó nướng lửa trên 6 phút nữa.

Trong chảo dầu nóng xào tỏi băm, hành tây và hành lá cho đến khi thơm. Cho một ít muối và tiêu rồi rải đều hành tây xung quanh cá nướng.

Cuộn với xà lách, dưa chuột thái lát, cá hồi và bơ. Ăn với nước mắm chấm!

Recipe by: Mai Hoang  
 Recipe for: Mai Hoang & Family

#### Nước Chấm

Bỏ vào tô 11 muỗng cà phê đường, 2 chén nước nóng, ½ chén nước mắm, 1 quả chanh nước ép, 1 muỗng canh tỏi băm, 1 muỗng canh sốt sambal ớt tỏi và khuấy đều.



Tool: Salmon Recipe Cards



Khmer & Latino CHA's salmon cooking demonstration at ECOSSE' Water Festival, a partnership event: 07/28/18

Tool: CHA Salmon Cooking Demo



(b) (6), (b)(4) copyright

Sean—photo by [revelritermedia.com](http://revelritermedia.com)

Cambodian fishers work to protect  
their community from contaminated

*"We don't eat the fish we catch anymore, only the salmon," says Sean.*

*"Instead, we educate people in the community about what fish are unsafe  
to eat."*



Tool: Media Outreach

(b) (6)



### Tips on Fishing Rules

Fishing rules help to protect the fish populations so we can all enjoy fishing – and our future generations too!

- If you are 15 years or older, you need a fishing license. Find out about types of licenses, costs, and where to buy: [wdfw.wa.gov/fishing/licenses/](http://wdfw.wa.gov/fishing/licenses/)
- You need a valid ID to buy a license. You don't need to be a US citizen (or have a SSN number) to get a license.
- It is illegal to catch and keep rockfish in this area.
- It is illegal to fish for salmon or trout with barbed hooks in Marine Areas 5-15 (including King County). It is illegal to snag salmon.
- Duwamish River requires a saltwater license (north of 1st Ave. bridge), freshwater license (south of 1st Ave. S. bridge), or combination license.
- Keep a Catch Record Card with you while fishing for salmon, steelhead, sturgeon, halibut, or Puget Sound Dungeness Crab. Return it to WDFW by April 30, even if you did not catch anything.



WA State Department of Fish & Wildlife (WDFW)  
360-862-2300 | [fishregs@doh.wa.gov](mailto:fishregs@doh.wa.gov)  
[wdfw.wa.gov/fishing/regulations/](http://wdfw.wa.gov/fishing/regulations/)

## King County Fishing Guide

Seafood Safe to Catch and Eat



PLUS!

- Map of Popular Fishing Sites
- Tips on Fishing Rules

# Fisher Input: Redesign of Fishing Map



# Tool: PHSKC Website

<https://www.kingcounty.gov/duwamish-fishing>

- ▶ Hosted by Public Health Seattle King County- multiple languages
- ▶ Features many of the tools described in this overview
- ▶ Digital Short Prepared By CHA:
  - <https://youtu.be/JMp0oyu6ZaY>

Home Public Health — Seattle & King County Environmental Health Services  
Community services and resources Fishing for safe seafood to eat

## Fishing for safe seafood to eat

The only Duwamish seafood safe to eat is salmon



Health advice for moms and children

Duwamish River Superfund site

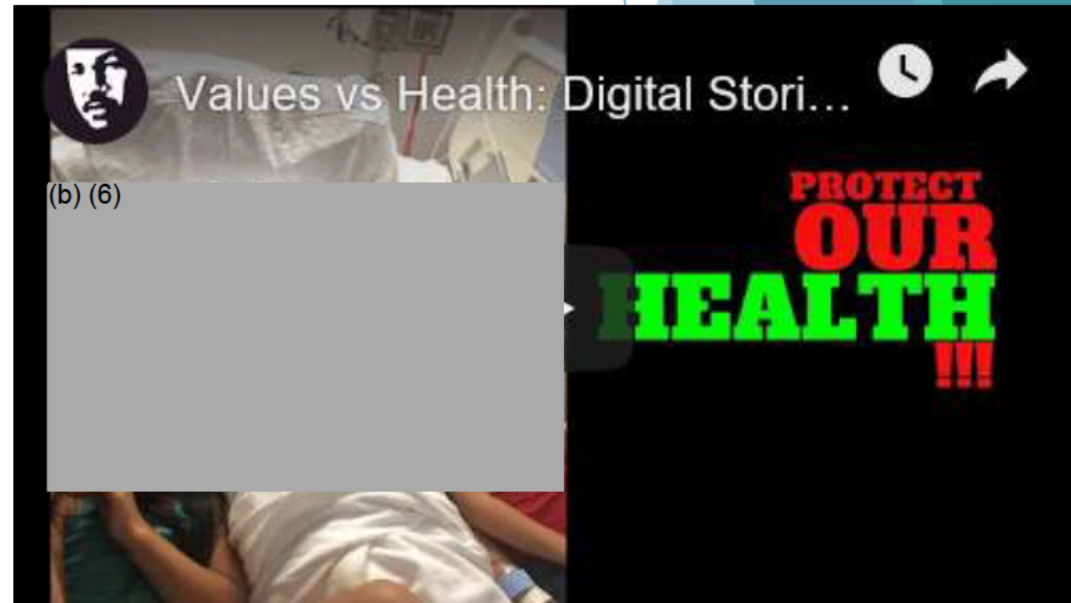
Community outreach

About the program

ភាសាខ្មែរ (Khmer)

Español (Spanish)

Tiếng việt (Vietnamese)



# Next Steps on ICIAP Report and Timeline

- Fish IC Plan for Communicating Fish Advisory
  - Development: PHSKC meetings with Community Steering Committee June - December 2018
  - EPA and PHSKC discuss Draft Plan concepts - early 2019
  - Final Draft Plan- June 2019

(b) (6)



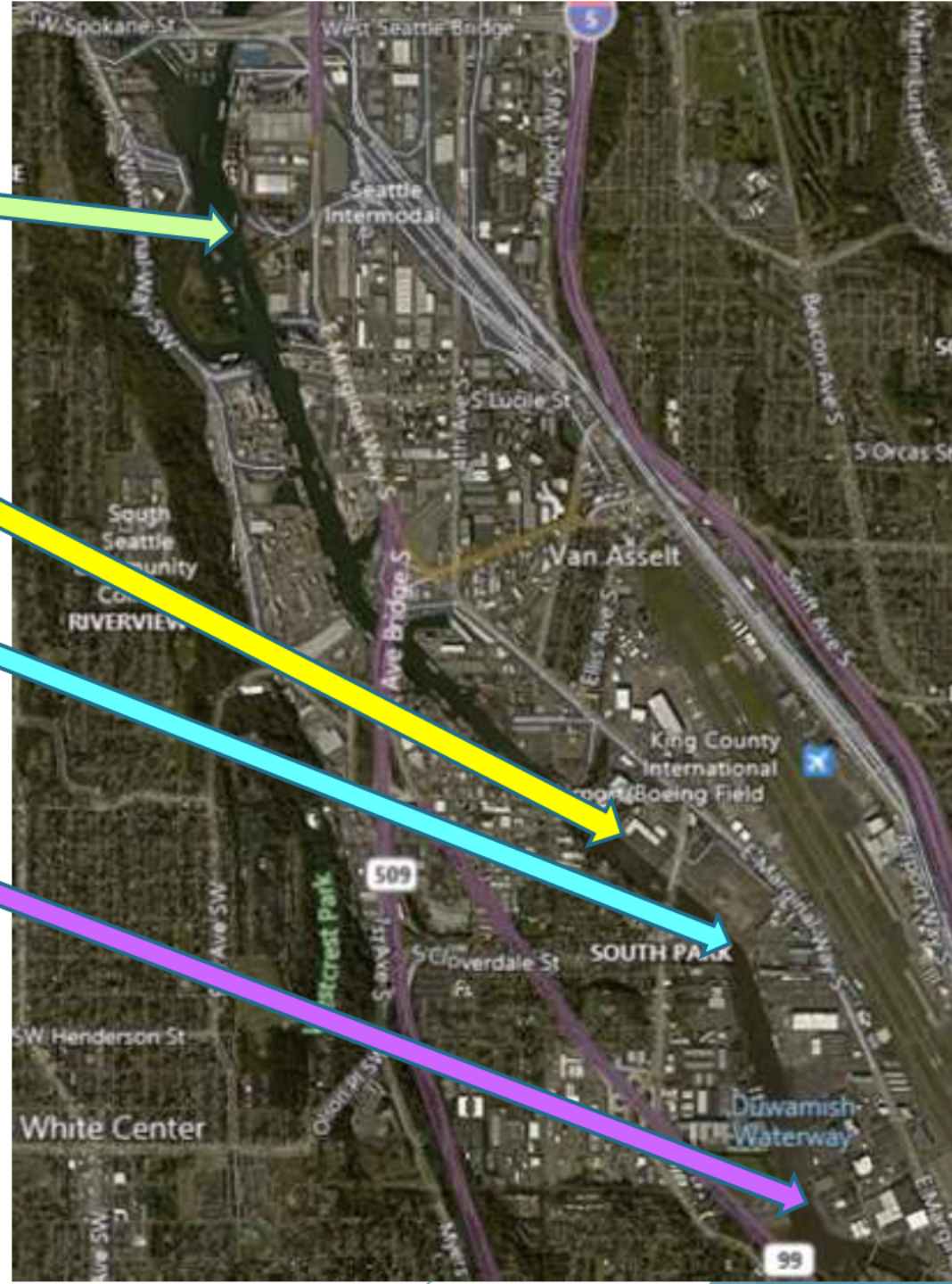


# Questions?

Rebecca Chu  
Project Manager  
(206) 553-1774  
[Chu.Rebecca@epa.gov](mailto:Chu.Rebecca@epa.gov)

# Updates on EPA Upland Sites



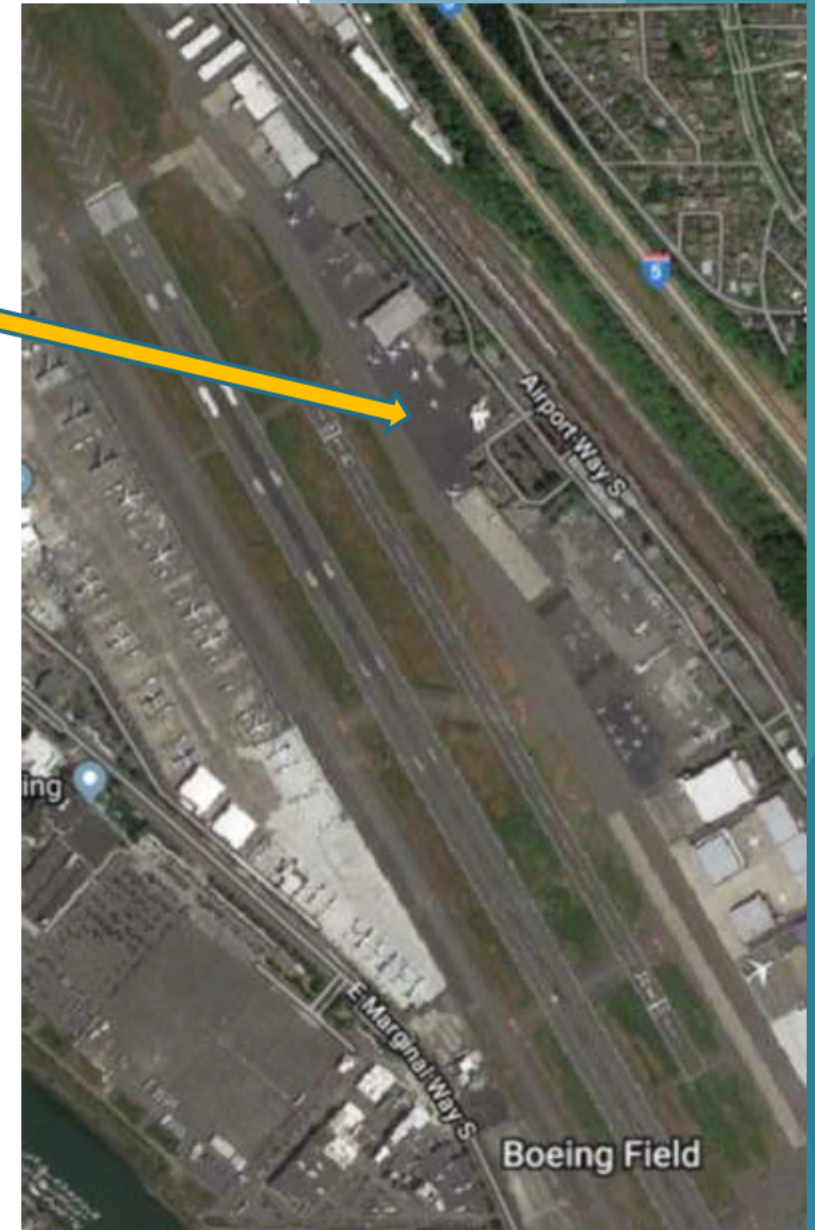


# Boeing Electronics Manufacturing Facility

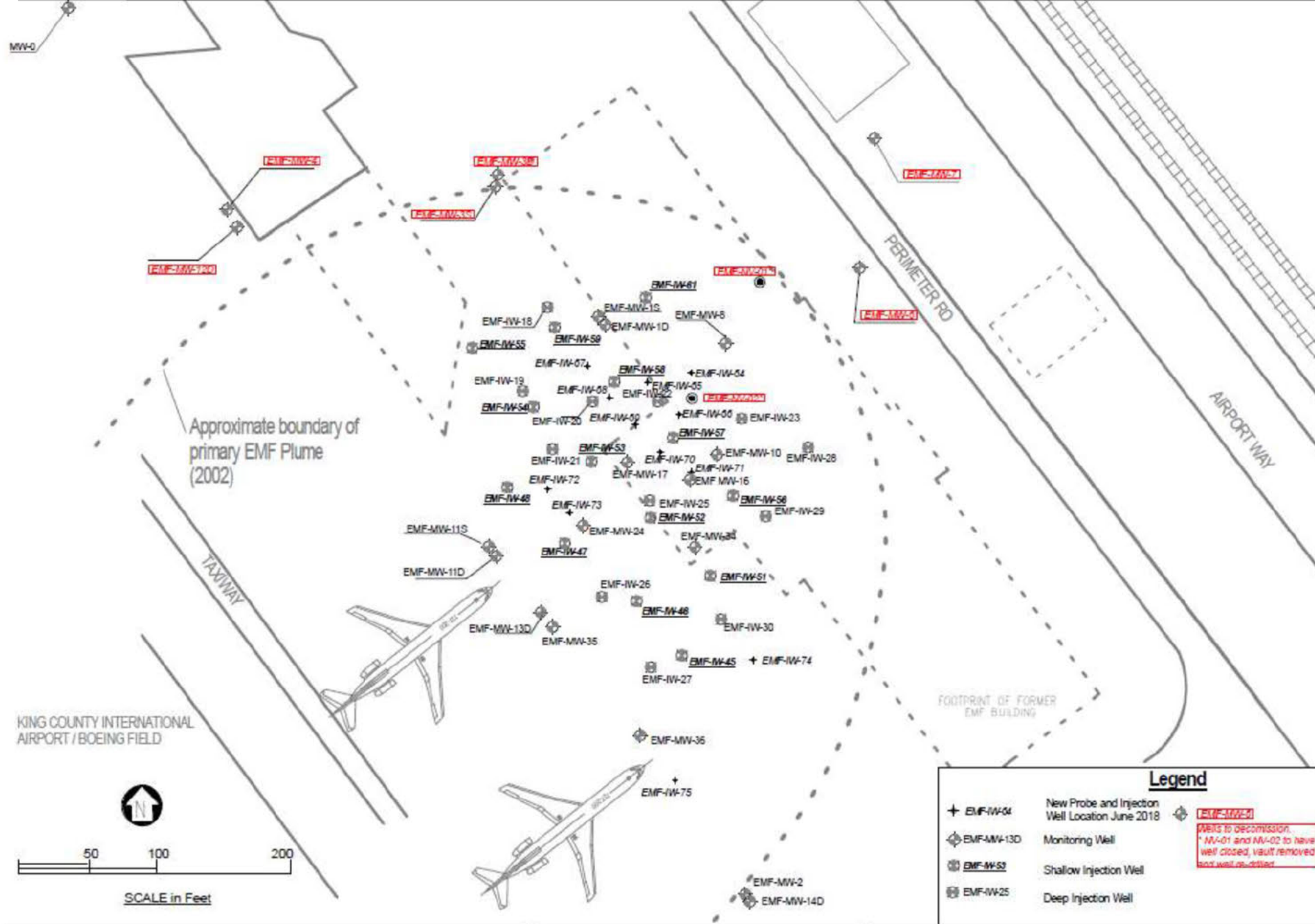
Planned projects near the EMF property: large aircraft parking project (LAPP)

Boeing plans to decommission multiple wells outside the current plume area that are no longer required for monitoring.

- However, two in-plume wells and their vaults must be dealt with in order for these projects to proceed.







# Former Rhone Poulenc

- ▶ RCRA site - East parcel is clean, owned by Museum of Flight, west parcel studies ongoing, slurry wall around groundwater plume in place
- ▶ Pilot test of CO<sub>2</sub> injection completed: successful at lowering pH.
- ▶ Expect to incorporate this technology into corrective measures study (CMS).
- ▶ Power affected about a week in April due to downed lines - hydraulic containment was maintained.





# Rainier Commons (former Rainier Brewery)

- ▶ Ongoing paint removal to address PCBs on multiple surfaces
- ▶ Approval of plans for Phase 2b and Phase 3 work expected this summer, followed by completion of paint removal starting this fall.



# Boeing Plant 2

- ▶ When the draft Statement of Basis is issued, public will have and opportunity for comment on the environmental covenants and the Pavement and Subsurface Materials Management Plan in addition to the Corrective Measures Study and Statement of Basis.





# ACTIVATED CARBON-AMENDED ENHANCED NATURAL RECOVERY RESULTS FROM THE LOWER DUWAMISH WATERWAY

Kristen Kerns  
Risk Assessor  
USACE, Seattle, District

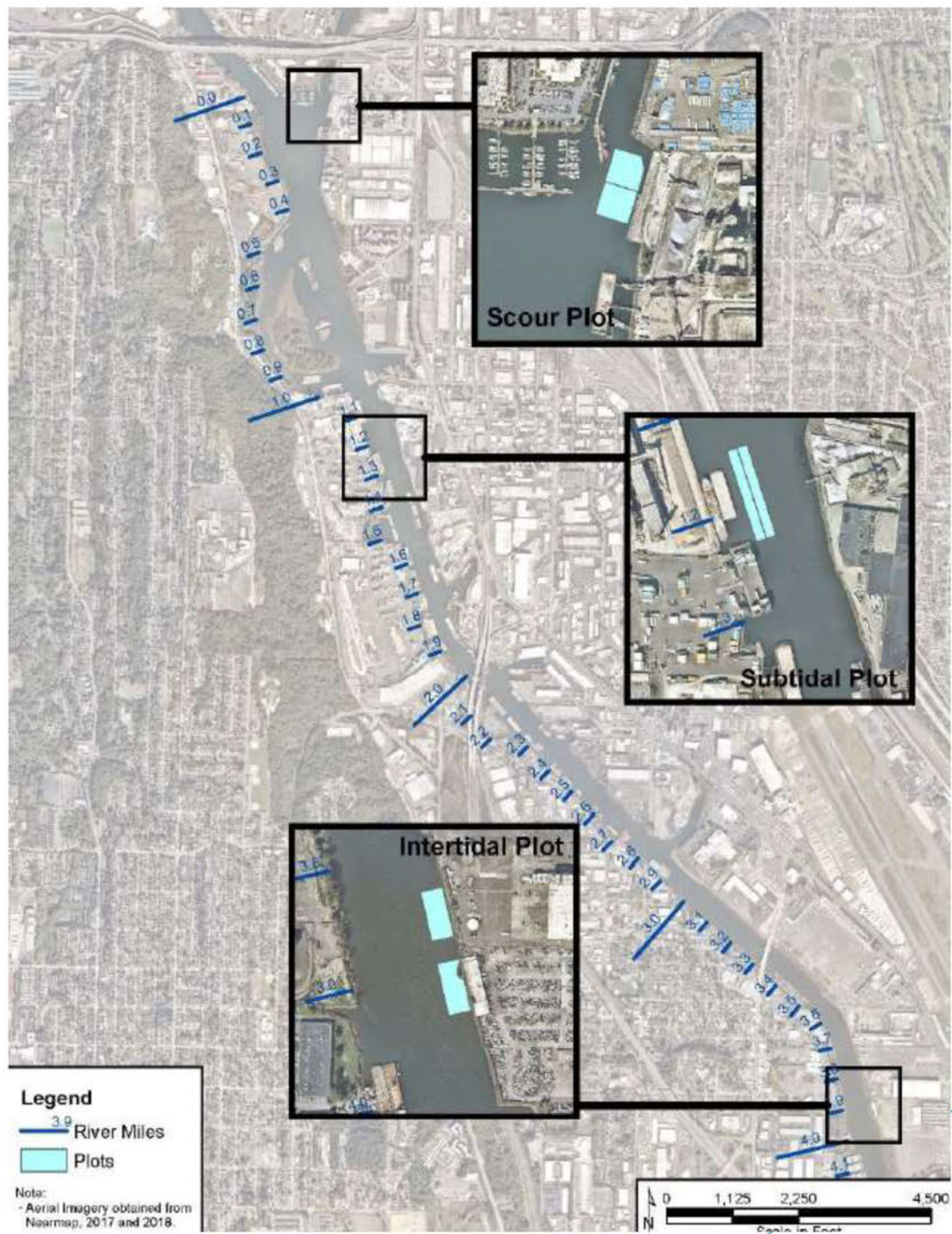


US Army Corps  
of Engineers®

# Pilot study objectives

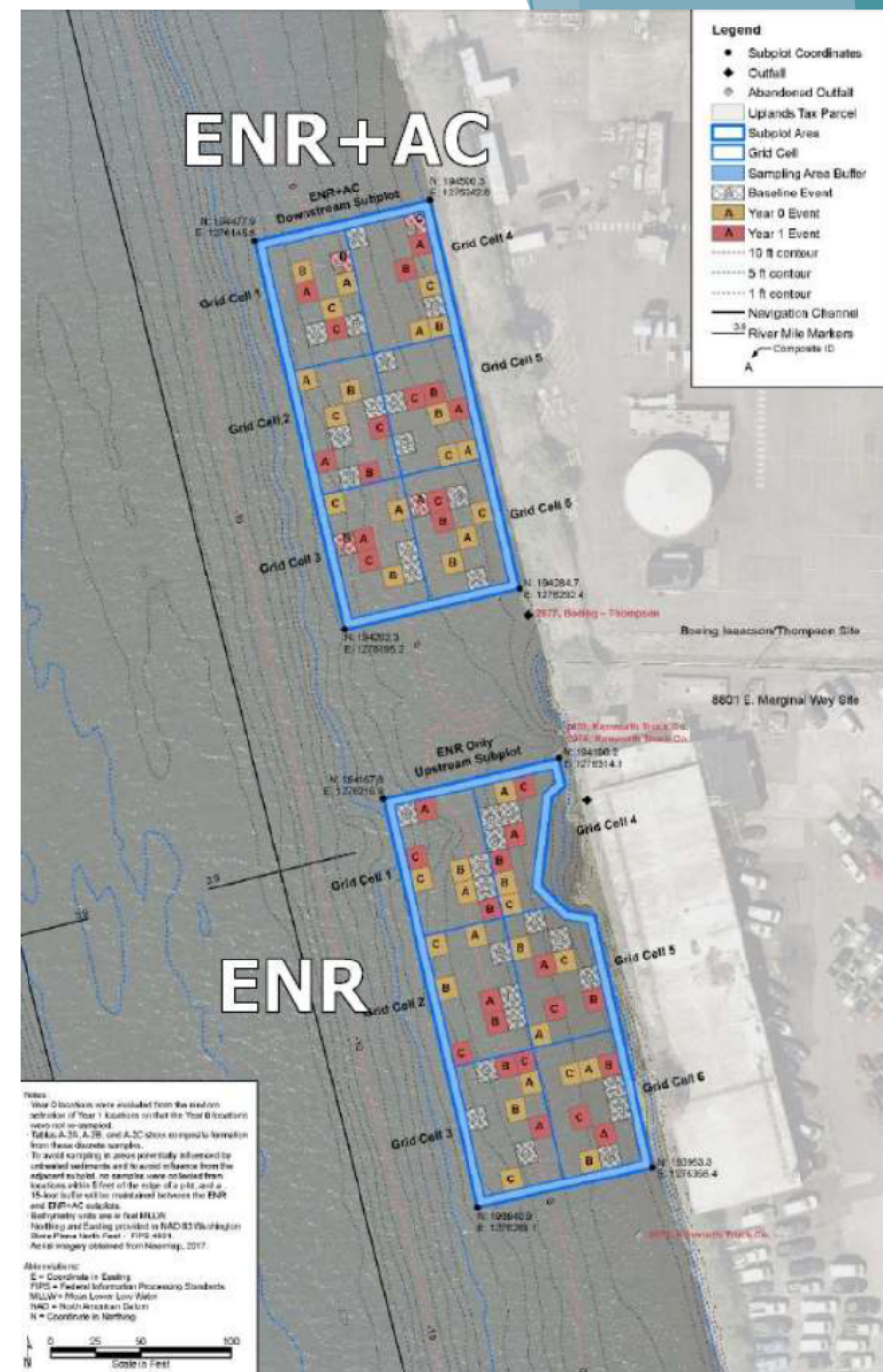
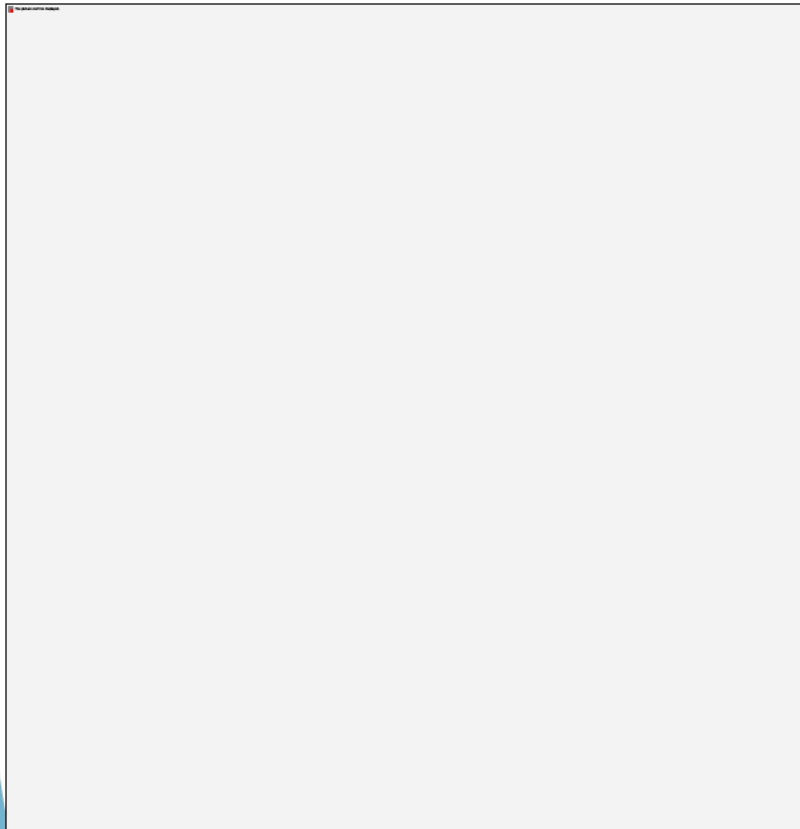
- Verify that ENR+AC can be successfully applied in the LDW by monitoring physical placement success (uniformity of coverage and percentage of carbon in a placed layer).
- Evaluate the performance of ENR+AC compared to ENR alone in locations with a range of PCB concentrations.
- Assess potential impacts on the benthic community in ENR+AC compared to ENR alone.
- Assess changes in bioavailability of PCBs in ENR+AC compared to ENR alone.
- Assess the stability of ENR+AC in scour areas (such as berthing areas).





# Intertidal plot

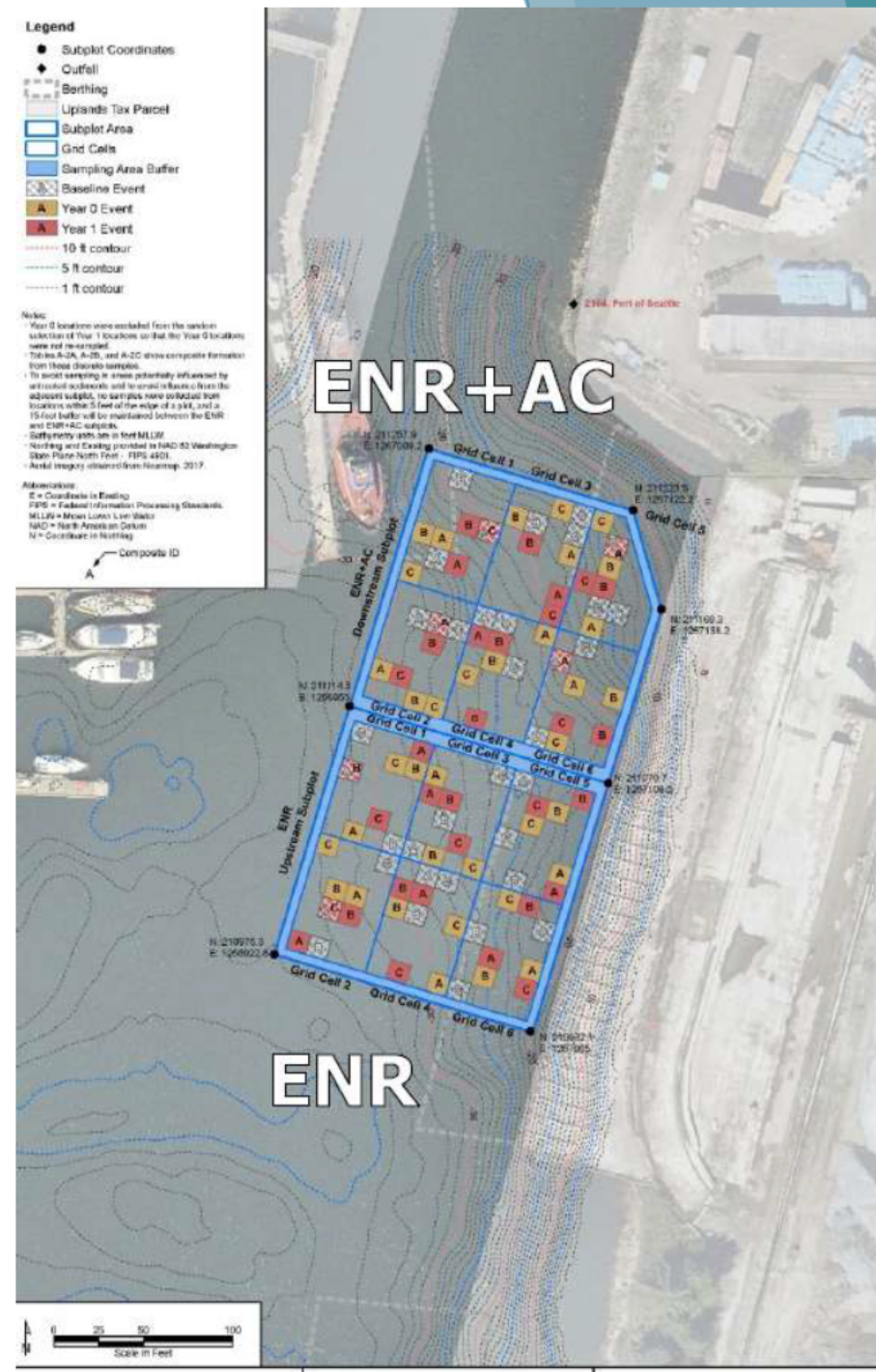
- ENR material consists of a gravel/sand substrate
- Baseline mean PCB bulk sediment concentrations of 196 and 221  $\mu\text{g}/\text{kg dw}$





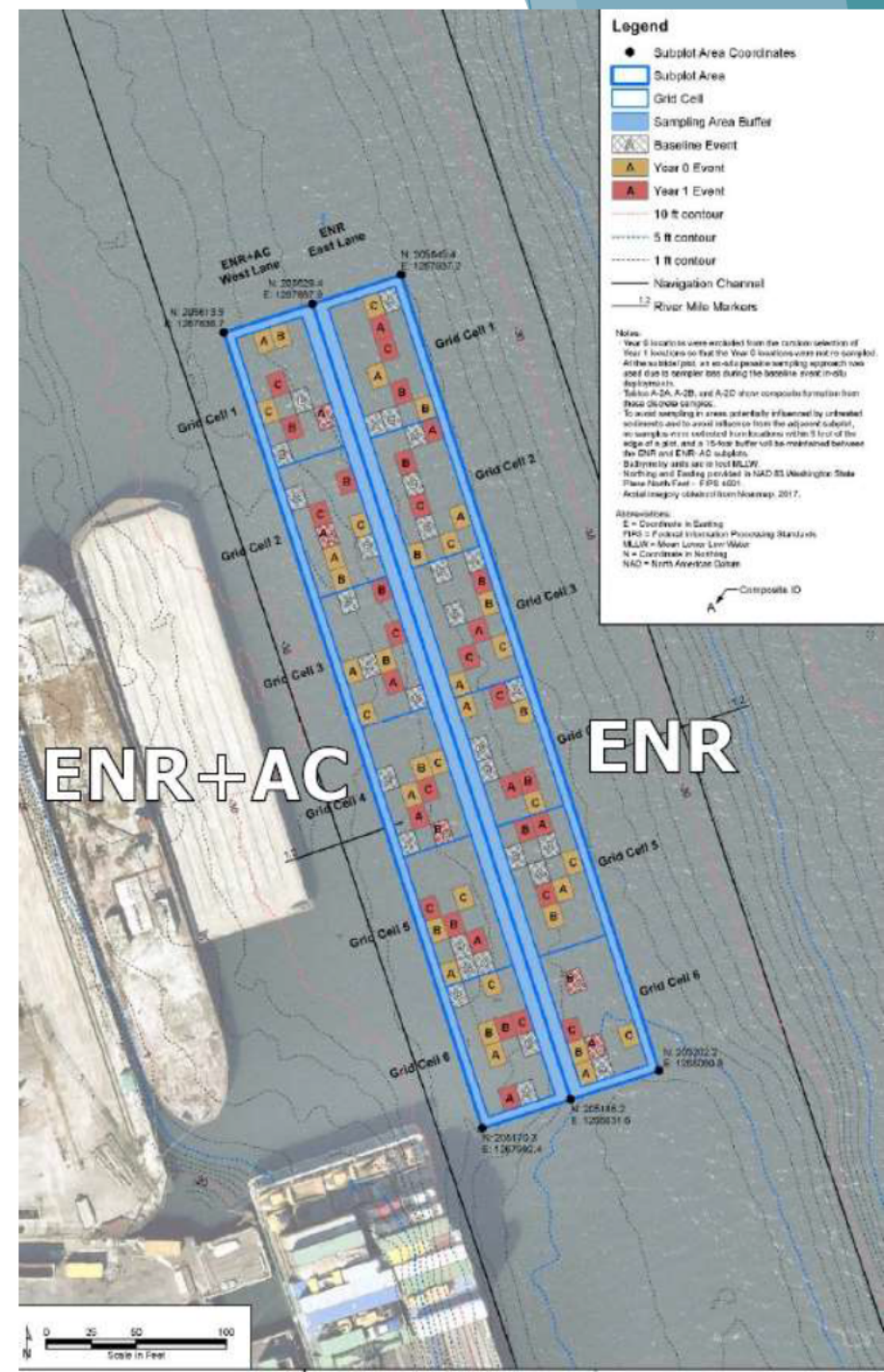
# Scour plot

- ENR material consists of a gravel/sand substrate
- Baseline mean PCB bulk sediment concentrations of 29.4 and 22.6  $\mu\text{g}/\text{kg dw}$
- Initial assumption that area is subject to scour may not be accurate



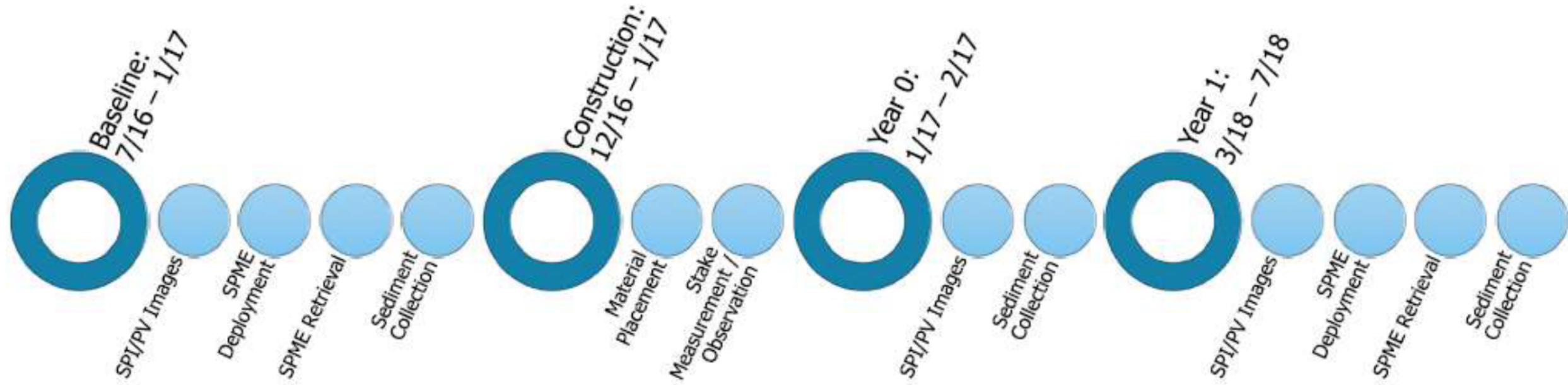
# Subtidal plot

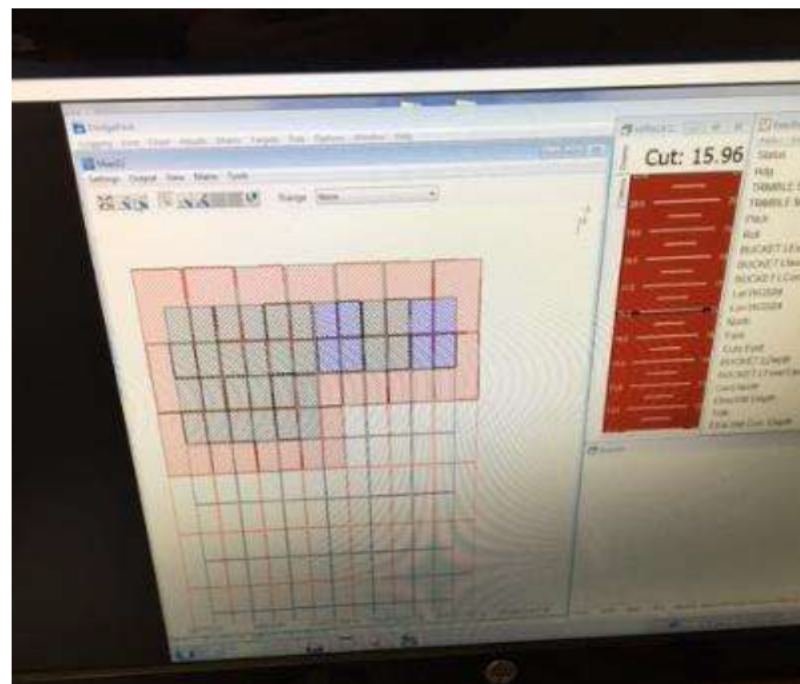
- ENR material consists of sand substrate
- Baseline mean PCB bulk sediment concentrations of 257 and 221  $\mu\text{g}/\text{kg dw}$
- Within navigation channel boundaries
- Monitoring has noted significant physical disturbance, possibly the result of barge tow bridle
- SPMEs performed ex-situ due to disturbance and initial loss of samplers during in-situ testing





# PROJECT TIMELINE

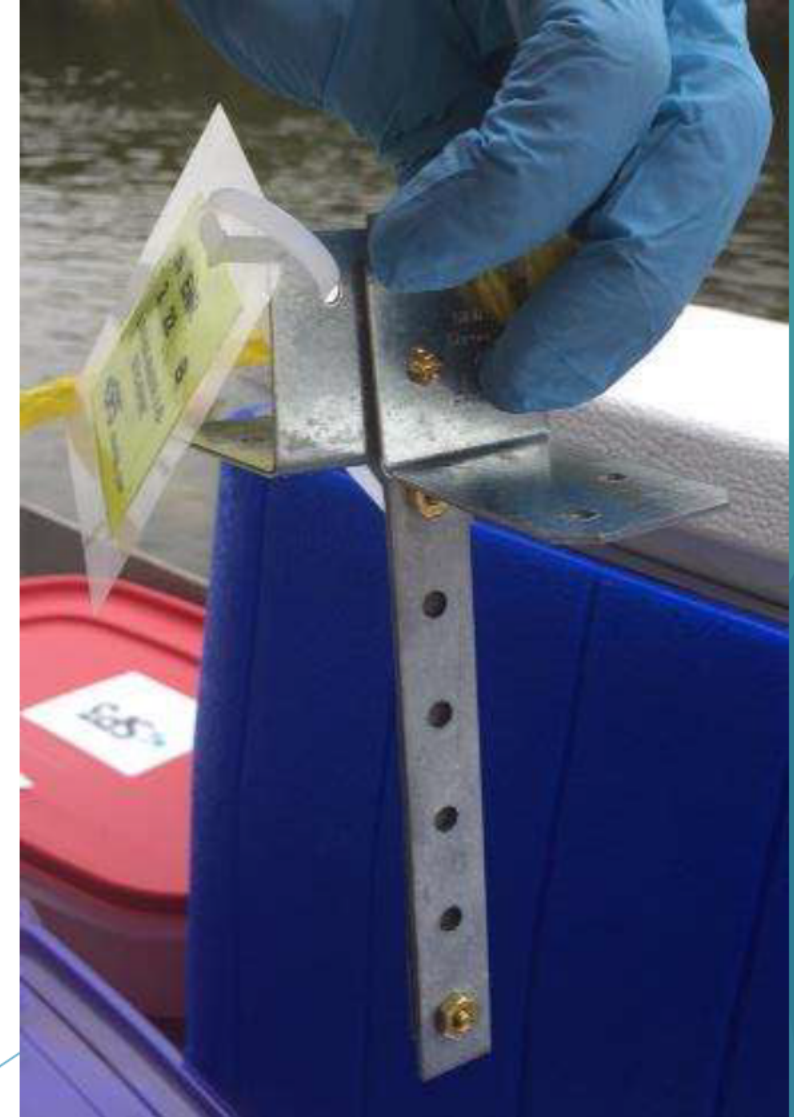
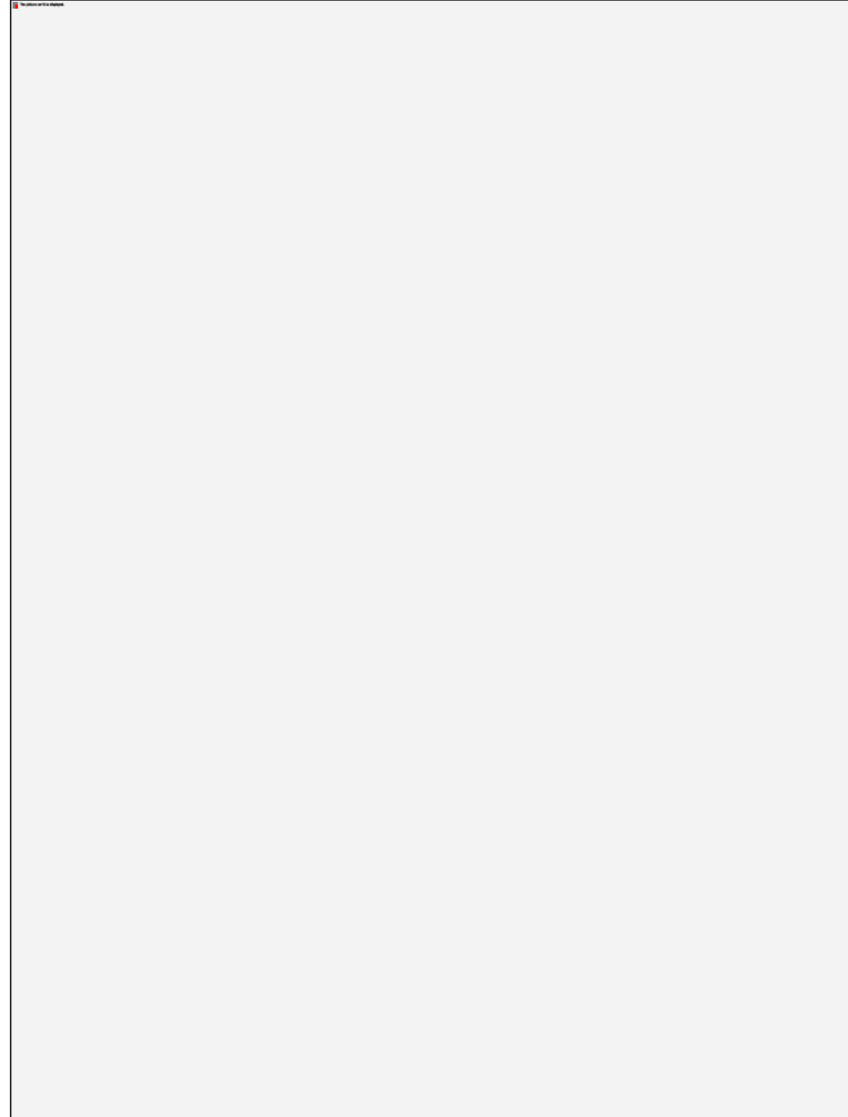






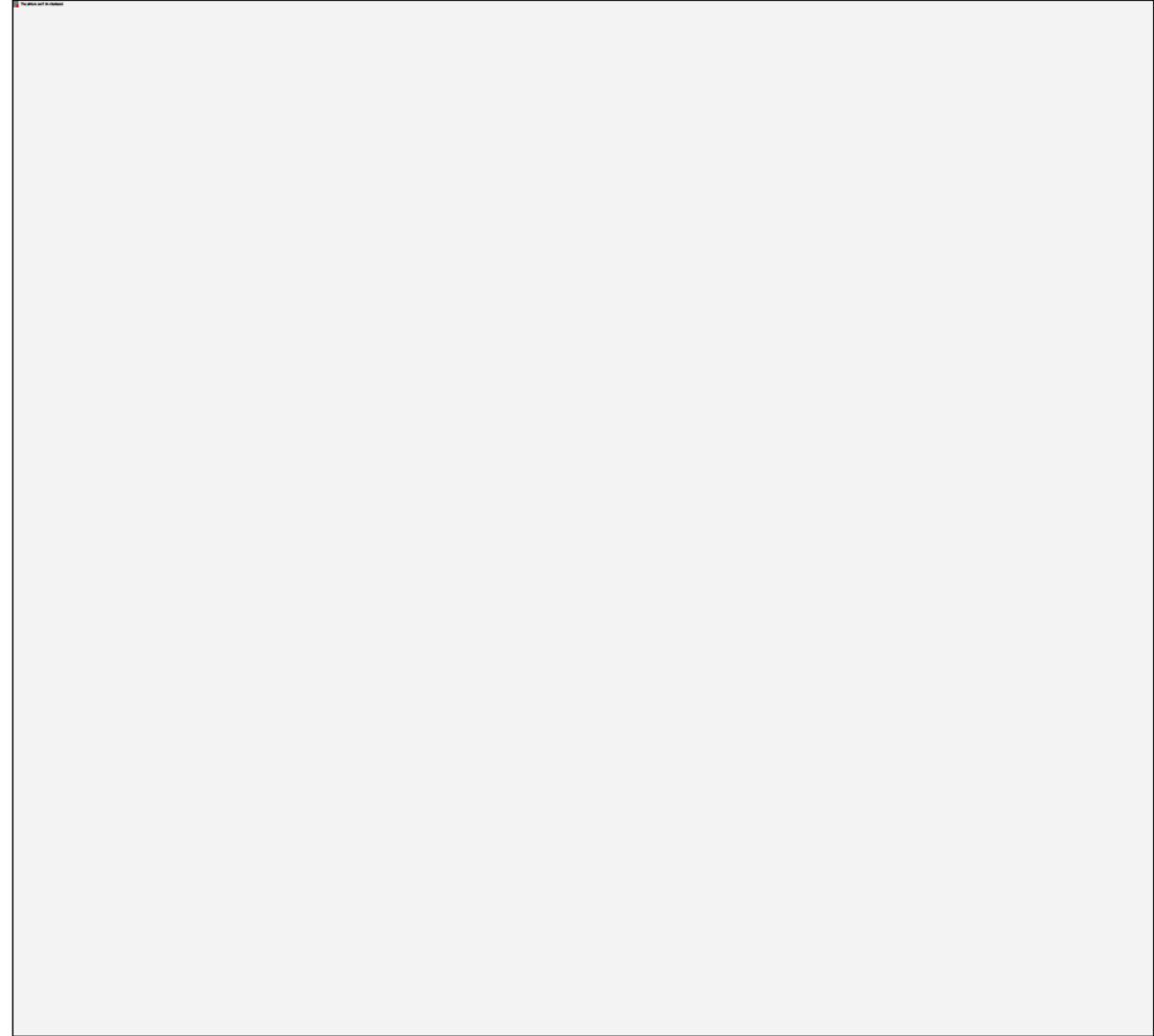
# Passive sampling with spme

- Measure  $C_{\text{free}}$  in porewater for PCBs
- Polydimethylsiloxane (PDMS)
- Performance Reference Compounds (PRCs) for PCBs
- Allowed to equilibrate for approximately 30 days in sediment



# Sediment profile imaging

- SPI and plan view imagery collected at Baseline, Year 0, and Year 1
- Baseline
  - 3 replicate images from 12 station in each plot (6 stations per subplot)
- Year 0 and Year 1
  - 3 replicate images from 24 stations in each plot (12 per subplot)





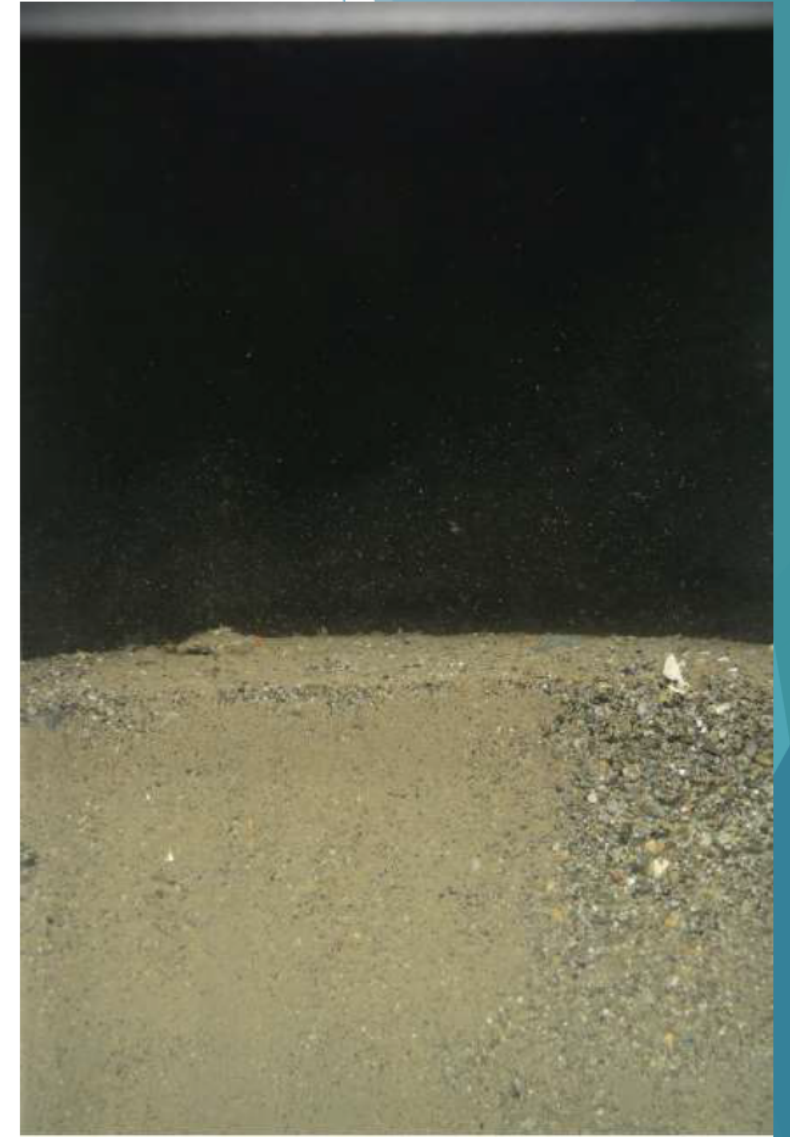
# Sediment profile imaging



Pre-construction



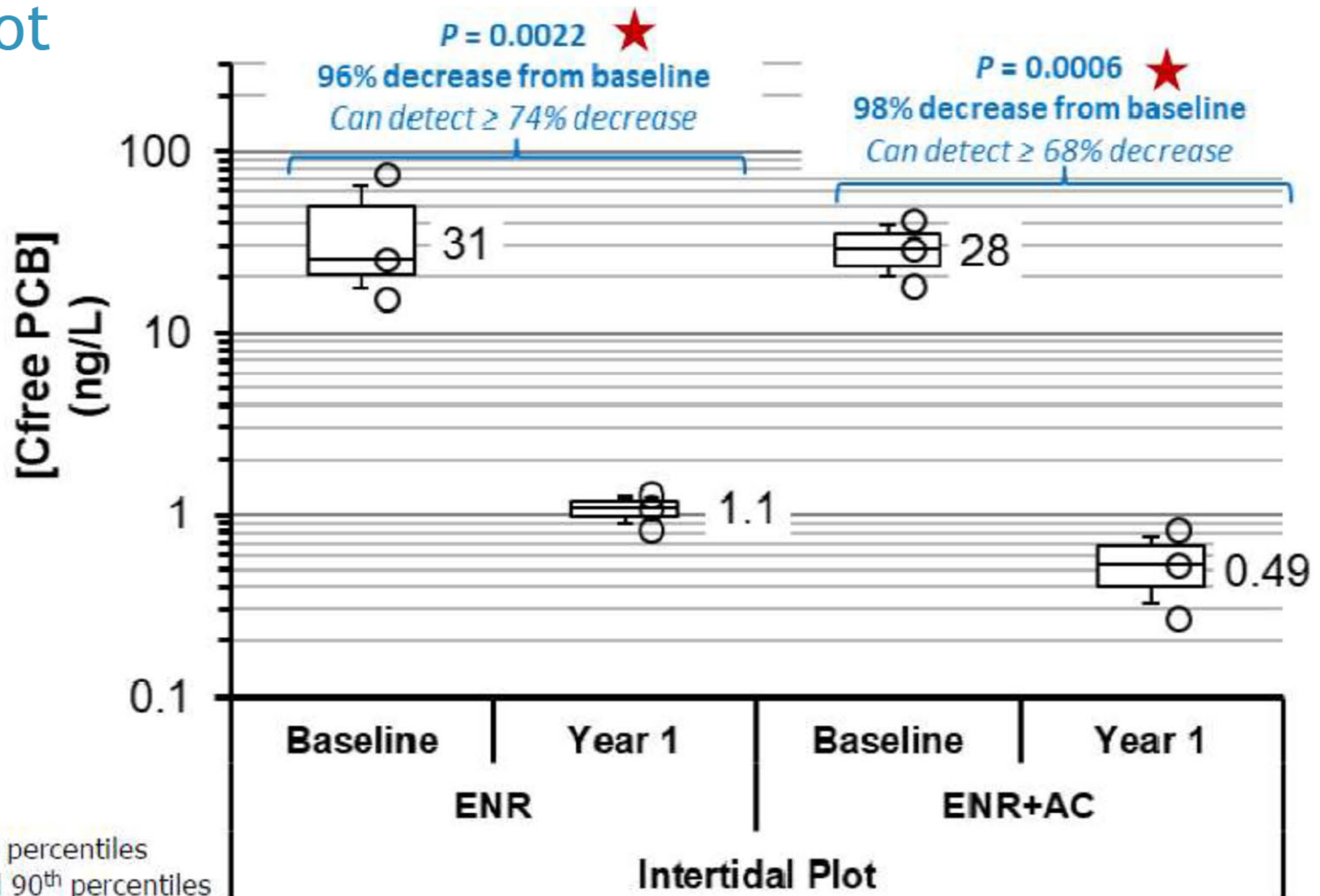
Post-construction



Year 1 Monitoring

results

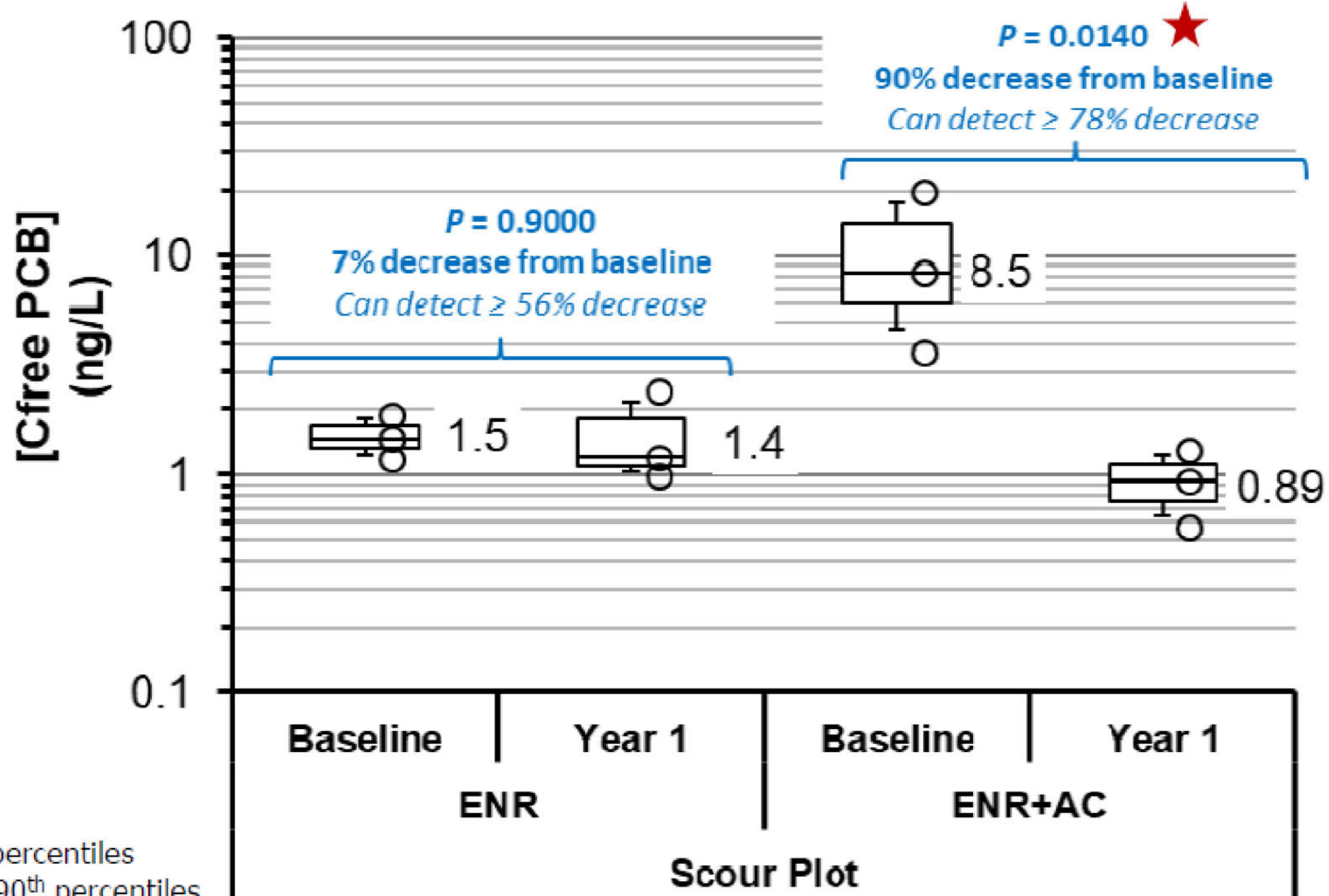
# Intertidal Plot Porewater



Source: Wood, Dalton-Olmsted-Fuglevand, Ramboll, Floyd I Snider, Geosyntec, Integral



# Scour PLOT Porewater



## Key

Circles – Raw data

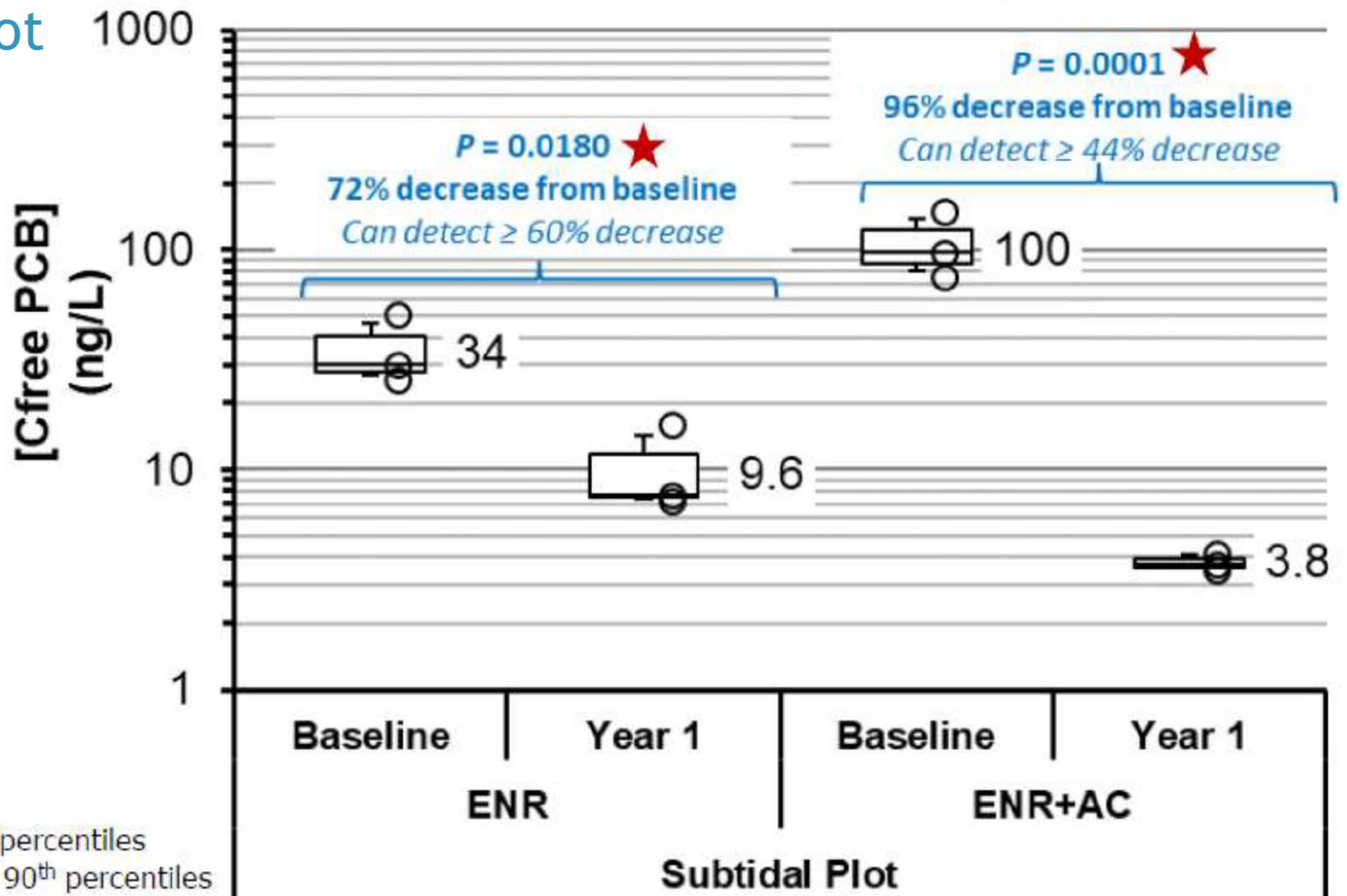
Boxes – 25<sup>th</sup> to 75<sup>th</sup> percentiles

Whiskers – 10<sup>th</sup> and 90<sup>th</sup> percentiles

Values – Geometric means

Source: Wood, Dalton-Olmsted-Fuglevand, Ramboll, Floyd I Snider, Geosyntec, Integral

# Subtidal Plot Porewater



Source: Wood, Dalton-Olmsted-Fuglevand, Ramboll, Floyd I Snider, Geosyntec, Integral

# Next Steps

- **Year 2 Monitoring (2019)**

- SPI
- Bulk sediment
- Porewater

- **Year 3 Monitoring (2020)**

- SPI
- Bulk sediment
- Porewater
- Benthic Survey
- Bioassay

- **Outcome**

- Consideration for inclusion of AC in ENR for the LDW Superfund Remedy



# Ecology Updates



# Nearby EPA Sites

Lockheed West Seattle,  
Harbor Island,  
East Waterway,  
Pacific Sound Resources (PSR)



# DRCC/TAG Updates

Next Stakeholders Meeting:

**November 13, 2019**

